

**GUIDELINES FOR FIELD INVESTIGATIONS  
RELATED TO WILDLIFE MORTALITY**

**September 1994**

compiled by:

U.S. Fish and Wildlife Service  
Division of Ecological Services-Environmental Contaminants  
and Division of Law Enforcement  
Region 1, Portland, Oregon

## GUIDELINES FOR FIELD INVESTIGATIONS RELATED TO WILDLIFE MORTALITY

### Purpose:

The purpose of this document is to provide guidance for the initial assessment and subsequent investigation of Fish and Wildlife die-off sites. The goal is for you, the investigator, to do your job efficiently and safely.

### Introduction:

Fish and wildlife resources are being exposed to a host of negative environmental factors. Contaminants and/or disease are often the cause of wildlife mortality. The investigation into the cause(s) of death is often difficult and sometimes dangerous. A disease or poison that kills wildlife may have the same effect on humans. Your initial assessment of the situation will not only impact the outcome of the investigation, but may effect the health of yourself and others as well. Keep in mind, it does not really matter if you are dealing with an intentional poisoning or an accidental contamination: either situation can be deadly.

Based upon your training, experience, observations, and information, you must decide how to proceed. Make the initial assessment from a safe distance upwind of the area. Try to identify the species and relative numbers of animals affected, as well as the geographical parameters. Based upon your best information, proceed in accordance with the following guidelines.

### **I. Initial Assessment**

- A. If it's obviously a disease situation involving migratory birds, contact the appropriate authorities and proceed pursuant to SOP: Bird Kill Investigations dated March 9, 1993, and Resource Publication 167 - Field Guide to Wildlife Diseases.
- B. If it's obviously a Fish Kill impacting State or private lands, contact the local State Fish and Game office. Consult the Field Manual for the Investigation of Fish Kills, Resource Publication 177. If a contaminant situation is suspected, refer to section II.
- C. Do not enter an area where you have reason to believe a deadly airborne contaminant is present. If it's apparent that you are dealing with wildlife mortality near a gas well-head or pit, be extremely cautious. Do not enter the area! Hydrogen sulfide gas can kill you within seconds.
- D. If, as a result of the initial assessment, a contaminant is suspected as being a factor in fish or wildlife mortality, refer to section II.

### **II. Investigation of Contaminated Sites:**

The following guidelines and attachments will assist you in your investigation at contaminated sites. However, it is imperative you understand that this information will not be sufficient for every situation you may encounter.

For example: this document does not cover oil spill contingency plans. They are being developed and will be made available in the future. In the meanwhile, use these guidelines as applicable.

A. What to Do and Look For in Field Investigations of Wildlife Poisoning.<sup>1</sup>

1. What is the cause of death? Did the animal die from a poison or is it bait?
2. Do a walk around within a 100 yard radius of carcass. Keep in mind that some poisons take several minutes to take effect and animals may travel further. For example, eagles may fly several miles to their roosting site.

**DO NOT TOUCH ANYTHING WITHOUT PROTECTION!  
(GLOVES and BOOTS INCLUDED)**

3. Document weather, description of area, unusual behavior of animals in the vicinity and take photos to illustrate the field scene and gather any other pertinent data to complete the case history (refer to Attachments IV. 1 and 2 for more information).
4. If your observations indicate a potential poisoning, retreat to a safe place and notify the appropriate authorities (see Attachment I. for agency directory assistance information). **NOTE:** You are responsible for knowing your local contacts and maintaining current phone numbers.

**REMEMBER: PERSONAL SAFETY IS YOUR RESPONSIBILITY! DO NOT REMAIN ON A CONTAMINATED SITE BY YOURSELF OR WITHOUT UTILIZING APPROPRIATE SAFETY EQUIPMENT!!**

5. If and when you return to the site, do so with other personnel and wear protective clothing - Tyvek coveralls, rubber boots or disposable footwear, gloves and safety glasses and a respirator or breathing apparatus. See #6 below for clarification on respirator usage.
6. Pay attention to wind and the potential for dust being mobilized in the air. Do not hesitate to wear a dust/mist mask. **NOTE:** Cartridge respirators should only be used by the person it is fitted for. **IMPROPER USE OF A RESPIRATOR IS DANGEROUS!**
7. Pay attention to unusual odors, such as: sweet, almond, rotten eggs, sulphur, etc.
8. Are there any containers that could contain chemicals, i.e. bags, barrels, etc.?
9. Utilize a bio-hazard/safety collection kit for collection of samples (see Attachment IV.3. concerning the components of a collection kit).

---

<sup>1</sup> Adapted from Shafer, Jo Ann. U.S. Fish and Wildlife Forensics Laboratory, Ashland, OR. "Safety Considerations in Wildlife Poisoning Investigations".

10. If samples are likely to be utilized as evidence, special care must be taken to document its location and the chain of custody. Take photographs prior to moving items and maintain a photo log describing the photos in sequence. (See Attachment V. for Law Enforcement concerns.)
11. If a die-off occurs in a body of water, do not wade through the water collecting carcasses without proper protection (only fool-proof water-resistant gear should be considered). The water may be the source of a toxin which can be absorbed through the skin.
12. Establish a decontamination level 'C' station with facilities to wash and decontaminate equipment and clothing and dispose of contaminated articles. (Refer to Attachments VI. and VII. for more information.)
13. When approaching a carcass, observe and make a note of all visible factors.
14. Does the carcass appear to have been intentionally placed there?
15. Are there other potential attractants present: peanut butter, antifreeze, meat products, chicken eggs, corn, seed, etc.?
16. Is there more than one dead animal in the vicinity?
17. What kinds of animals? Predator/carnivore/scavenger?
18. How far away are the animals from each other, or one animal in particular (potential bait)? Are animals circling a "bait" carcass (ring of death)?
19. Are they still on the "bait" carcass indicating a fast-acting poison?
20. What body position are the animals in? "Sawhorse" stance?
21. Any unusual substances visible on the animals?
  - coating its fur or tissue
  - around beak or mouth
  - residue
  - vomitus

ASSUME THESE SUBSTANCES HAVE THE POTENTIAL TO BE HIGHLY TOXIC AND HANDLE THEM ACCORDINGLY!

22. Any unusual substances on the surrounding vegetation?
23. Are there a number of dead insects (i.e., flies) indicating a highly toxic poison?
24. Learn and practice safe collection techniques.

#### B. Suggestions for Successful and Safe Evidence Collection

1. A two person team is a good rule. It protects you in the case of an acute exposure which requires medical attention and assists with the collection process (refer to Attachment IV. for detailed information).

2. Remove necessary items from the kit to perform sample collection: bags, pen/marker, tags, labels, etc. Make a biohazard bag available for disposal of items during the collection process. Be thoughtful during collection of hazardous samples and limit contact of contaminated gloves with exposed areas on the body (i.e., face, hair) and non-disposable items (i.e., glasses).

**DO NOT EAT, DRINK OR SMOKE DURING THIS PROCESS!**

3. To determine the cause of death of an animal, the whole carcass is necessary for necropsy; extensively decomposed animals may be of no value for analysis. In most cases, if no tissue or gut contents remain, useful diagnostic examination is not possible.
  - a. Label item with species (if obvious), date of collection, geographical location and other data necessary for your records.
  - b. Place the animal in an appropriate bag size (if possible) and place this bag in another bag. Be wary of poison-coated talons that may rip protective clothing and bags.

Any effort to secure talons by positioning them or covering with an extra layer of material is appreciated by the people who receive the items and are unwary of the hazard. Oversized bags for a small item present a hazard as well for the person having to "dive into" the bag to retrieve the item.
  - c. Remove the air (careful to avoid inhalation) and seal both bags securely.
4. If a large animal, like a sheep or deer carcass, is suspected to be a bait, take several samples for analysis.
  - a. Pay close attention to any areas with unusual visible substances. Take 3-5 samples in various locations on the carcass. The majority of samples should be taken on the exposed side of the carcass.
  - b. Use a knife and forceps to obtain a fist-sized sample.

**USE EXTREME CAUTION WIELDING A SHARP TOOL ON A POTENTIALLY POISONOUS CARCASS!**

- c. Using the forceps, place the sample of tissue in a ziplock bag and place that bag in a second ziplock. Carefully remove air and seal securely.
- d. Label items with geographical location, location on carcass, species (if obvious), date of collection and other data pertinent to your records.
- e. Large bait carcasses sometimes pose a sampling dilemma. Poison may be applied in a haphazard

fashion making it difficult to select sites for sampling. Large sections of a carcass (hind leg) have been sent in for analysis.

**NOTE:** A high percentage of analyses of these baits have revealed extremely high concentrations of poison which may indicate that the 3-5 samples are adequate.

- f. Spray knife and forceps with 10% bleach and wipe with paper towel. Wipe again with moist towelette and wipe dry with paper towel. Proceed with collection.

**IMPORTANT: IT IS IMPERATIVE THAT THE KNIFE AND FORCEPS BE CLEANED BETWEEN EACH SAMPLING!**

- 5. Collect any suspicious food sources: meat product, eggs, corn, seed, etc.
  - a. Corn or seed specimens can be collected in film vials or ziplock bags, depending on the quantity.
  - b. Collect small meat products following the procedure for whole animal carcasses.
  - c. Eggs should be collected in such a way to prevent breakage.
- 6. If a syringe is discovered, use extreme caution in handling this item. A syringe may contain pure poison which was used to inject the poison into a bait. Treat a syringe like a loaded gun!

A syringe should be handled predominantly with one hand holding the needle end away from your body and anyone else's. Syringes may be capped using a cork. Never cap a syringe using two hands!

This increases the risk of slipping and puncturing the hand holding the cap. Using the syringe transport container, press the needle into the cork (lying on a flat surface) and place inside the container.

- 7. If water is the suspected source of poison, use a disposable pipette to aspirate a sample and collect in plastic sample bottles.
- 8. If you are dealing with barrels or bags of unknown chemicals, be extremely cautious. Consult the Environmental Protection Agency for assistance. Do not take unnecessary chances with unknowns.
- 9. The same advice applies to known poisons. Do not try to do something beyond your capacity to do it safely.
- 10. At the finish of the collection process, carefully remove protective gear. Be thoughtful of the sequence of removal. Do not remove gloves until all

potentially contaminated gear is discarded (you may want to change gloves during the cleanup process). Discard disposable items in the biohazard bag. Put other items into a garbage bag to be decontaminated later. Remove gloves one at a time. Grab at the wrist of one glove and peel off until it is inside out. Discard gloves.

Remember: Protect yourself and your family by not bringing home contaminated materials.

11. Carcasses that are suspected to be bait and not removed from the field should be disposed of according to local hazardous material regulations. Burying a carcass is not recommended. Scavengers can easily dig up a carcass. Digging a pit and incinerating the carcass is recommended only if approved by the proper local authorities.
12. Ship specimens according to the recommendations of the receiving facility. All specimens should be kept cold or frozen in a location that does not create a hazard to humans or wildlife.
13. Refer to Attachment IV.4. for additional information on collection and preservation of evidence.
14. Refer to Attachment IV.5. for information concerning laboratory capabilities and addresses.
15. Refer to Attachment IV.6. for information concerning the shipment of dangerous materials by Federal Express.

## ATTACHMENTS

- I. Directory of Agencies with Contaminant Related Responsibilities
- II. Wildlife Diseases
  1. Field Guide to Wildlife Diseases (Resource Publication 167)
  2. Standard Operating Procedures (SOPs) for Bird Kill (Die-off) Investigations and Field Procedures for Euthanasia of Birds
- III. Fish Kills
  1. Field Manual for the Investigation of Fish Kills (Resource Publication 177)
- IV. Contaminant Investigations
  1. Examples of Poisoning Cases
  2. List of Investigative Questions
  3. Bio-hazard Collection Kit Information
  4. Recommendations for the Collection, Preservation and Shipment of Samples
  5. Where to Send Samples
  6. Federal Express Information
  7. Catalog Information for Certified Transportation Containers
- V. Law Enforcement Information
  1. The Division of Law Enforcement Role
  2. Chain of Custody Record
  3. Overview of Environmental Protection Regulations
- VI. Copies of Selected Natural Resource Damage Assessment SOPs
  1. Procedures for the Decontamination of Field and Laboratory Equipment, SOP 1019.3707
  2. Quantitative Survey of Dead Wildlife, SOP 1019.3723
  3. Sample Documentation and Custody Procedures for U.S. Fish and Wildlife Service Natural Resource Damage Assessment, SOP 1019.3701
- VII. Site Control and Decontamination
  1. Site Layout and Contamination Control from Hazcon, Inc.
  2. Personnel Protection and Safety - guidelines from the Environmental Protection Agency



DIRECTORY: AGENCIES WITH WILDLIFE CONTAMINANT RESPONSIBILITIES

Federal Agencies:

U. S. Fish and Wildlife Service-Division of Environmental Contaminants

Regional Office: - (503) 231-6223  
Don Steffeck, Division Chief  
Tom O'Brien, Branch Chief, CPIM  
Roger Helm, Branch Chief, NRDA & Spill Response

Field Offices with Environmental Contaminant Specialists:

California

Sacramento - (916) 978-5603  
Jim Haas (ext. 326)  
Tom Maurer (ext. 327)  
Steve Schwarzbach  
Dan Welsh  
Joseph Skorupa  
John Henderson  
Laura Valoppi  
Bill Beckon  
Carmen Thomas  
Larry Thompson  
Catherine Johnson  
Rosa Montilla  
Terry Adel sbach

Carlsbad - (619) 431-9440  
Carol Roberts  
Judy Gibson  
Carol Gorbi cs

Ventura - (805) 644-1766  
Walter Sadi nski  
Stephen Henry  
Louise Lampara  
Lisa Roberts  
Denise Steurer

Hawaii

Honol ul u - (808) 541-2749  
Don Pal awski  
Chris Swenson  
Lee Ann Woodward  
Kevin Foster  
Colleen Hanson

Idaho

Boise - (208) 378-5265  
Susan Burch

Nevada

Reno - (702) 784-5227  
Steve Wi emeyer  
Peter Tuttle  
Dami an Hi ggi ns

Las Vegas - (702) 647-5230  
Erik Orsak

Oregon

Portland - (503) 231-6179  
Ted Buerger  
Jeremy Buck  
Elizabeth Materna  
Mike Szumski

Klamath Basin - (503) 885-8481  
Elaine Snyder-Conn

Washington

Lacey - (360) 753-5821  
Kate Benkert  
Denise Baker  
Jeff Krausmann  
Cindy Chaffee  
Jay Davis  
Judy Lantor  
Mary Mahaffey

Moses Lake - (509) 765-6125  
Mark Miller

Spokane - (509) 891-0450  
Dan Audet  
Toni Davidson  
Brad Frazier  
Mark Snyder  
Julie Campbell

Division of Law Enforcement (Regional Office)  
Portland, OR (503) 231-6125

David McMullen  
William B. Zimmerman

Field Offices of Special Agents:

California:

Burlingame - (650) 876-9078  
Steven Furrer  
Robert Snow

Chico - (530) 342-8724  
John Mendoza  
Joe Sandburg

Clovis - (209) 487-5773  
Kevin Garlick  
Pamela Ventura

Los Angeles - (310) 328-1515  
Larry Farrington  
Diane Petrucci  
Marie Palladini

Sacramento - (916) 978-4861  
Scott Pearson  
Chris Brong  
Terry Jorgenson

San Diego - (619) 557-5063  
John L. Brooks  
Lisa Nichols

Los Omos - (805) 528-7980  
William Talkin Jr.

Guam: - 700 550-7151 or  
671-472-7151

Hawai i:

Honol ul u - (808) 541-2681  
A. Eugene Hester  
George Phocas

I daho:

Boi se - (208) 378-5333  
Richard McDonald  
Paul Weyland

I daho Fal l s - (208) 523-0855  
Steve Magone

Nevada:

Las Vegas - (702) 388-6380  
Ed Dominguez

Reno - (702) 861-6360  
Barry Jordan

Oregon:

Kl amath Fal l s - (503) 883-6900  
Kenner Harrington

Portl and - (503) 682-6131  
Pete Nylander  
Jerry Woods  
Earl Kiser

Washi ngton:

Redmond - (206) 883-8122  
Richard Lichtenburg  
Larry Keeney  
Philip Knudsen

Bel l i ngham - (206) 733-0963  
Thomas Chisdock

Ol ympi a - (360) 753-7764  
Robert Romero

Spokane - (509) 928-6050

Roger Parker  
Vancouver - (360) 696-7666  
Ed Wickersham

United States Environmental Protection Agency

Other Federal Agencies

[National Wildlife Health Laboratory](#) Madison, WI ([USGS](#))

State Agencies

[California:](#)  
Department of Fish and Game

[Hawaii:](#)  
Division of Aquatic Resources  
Department of Land and Natural Resources

[Idaho:](#)  
Idaho Department of Fish and Game

[Nevada:](#)  
Division of Wildlife

[Oregon:](#)  
Oregon Department of Fish and Wildlife

[Washington:](#)  
Washington Department of Fish and Wildlife

County and Local Agencies

SOP: Bird Kill (Die-off) Investigations

Date Prepared: March 9, 1993

Date Revised:

## I. General

Field procedures outlined in this SOP are in accordance with guidelines in Friend (1987) and 43 CFR 11.60-64 (when applicable). These guidelines have been modified only under recommendations of National Wildlife Health Center (NWHC) staff and/or field tested changes designed for a more efficient response.

For natural resource damage assessment (NRDA) wildlife kill investigation, injury has occurred when a significant increase in frequency or number of dead or dying birds can be measured in a population sample from the assessment area as compared to a population sample from a control area (43 CFR 11.62). Also in accordance with 43 CFR 11.62, the appropriate pathway for the hazardous material to have caused the mortality must be established.

## II. Equipment

The following equipment is needed for an adequate and efficient response to a bird die-off.

cooler(s)	blue ice
chain of custody forms	I-chem jars
sample specimen history form	latex or rubber gloves
camera (optional)	slide film (optional)
black ink pen	black permanent marker
logbook (waterproof/numbered)	sample tags or seizure tags
Federal Express forms	garbage bags
ziplock storage bags	packing tape
chain of custody tape	scissors
chain of custody seals	maps of die-off area
State Wildlife Permit (if euthanizing birds)	
Federal Fish and Wildlife Permit #PRT-762555	
packing material (bubble wrap or newspaper)	
NWHC phone # (608) 271-4640	

## III. Procedure

**IMPORTANT:** If bird die-off may be a legal case, be sure to follow chain of custody requirements. The minimum requirements are that U.S. Fish and Wildlife Service Form 3-2063 (3/90) is filled out completely and all transfers (releases) of the sample

1. Always wear rubber or latex gloves when handling carcasses. If a highly infectious disease is suspected, call NWHC for instructions on handling, otherwise, follow this SOP.

2. Determine if bird is dead or moribund. If moribund, read

euthanasia SOP before proceeding.

3. Maintain records in logbook (numbered pages) and transcribe information to sample specimen history form. Record all significant events related to the die-off and avoid preconceptions that may limit the information collected.

4. Information helpful in diagnosing the cause and assessing severity of a problem include:

- a. environmental factors (weather, food shortage, water level, water quality)
- b. estimating disease onset
- c. species affected
- d. age
- e. sex
- f. number of sick or dead
- g. clinical signs (see Friend, 1987 for discussion)
- h. population at risk
- i. population movement
- j. specific features of problem area

As much of this information as possible should be included in the sample specimen history forms for NWHC evaluation.

5. When size of carcass and its condition permit, the best specimen for submission to NWHC for diagnostic examination is an entire carcass. If possible, carcasses should not be dissected in the field without first consulting NWHC to determine best procedure and what are the appropriate organs to remove and submit for examination.

6. Carcasses sent to NWHC should be as fresh and undamaged as possible. However, for natural resource damage assessments and other legal cases, it is recommended all carcasses (including preyed, decomposing, and/or autolyzed) be collected and recorded in the logbook. While these samples may not be sent to NWHC, they may prove useful for other types of chemical analyses.

7. Identify each carcass separately with a manila tag fastened by wire to a leg, or a seizure tag tied to leg, or if these are not available, use a 3x5 inch card inside the plastic bag (size dependant upon size of bird) with carcass. Information on these tags should include:

- submitter's name and affiliation
- collection site
- collected date
- species
- collected dead or euthanized (indicate method of latter)
- any clinical signs
- NWHC case number (if known)

Use indelible marker to fill out tag. For natural resource damage assessments, also include the NRDA case number.

8. Place each tagged carcass in a separate plastic bag and tie or seal shut to prevent leakage. Identify specimen enclosed with a tag on

the outside of the bag.

9. Chill all specimens. (Use refrigeration, blue ice packs, block ice, or ice cubes). The best method is dependent on how long shipping to NWHC will take. If samples must be held 2 days or more before shipment, samples should be frozen as soon as possible after collection to reduce decomposition. Samples held for less than 2 days require refrigeration, blue ice, block ice, or ice cubes.

10. Call NWHC to determine optimal time to ship samples. Brief NWHC staff on general history of samples and if chain of custody is required. NWHC may require additional information.

11. Once given permission to send samples to NWHC, prepare samples for shipment on the day of shipment, when possible.

12. Individual samples should be double-bagged (isolating samples from one another). For maximum protection, line cooler with a plastic bag to prevent leakage of fluids.

13. Styrofoam coolers shipped in cardboard boxes are desirable. Hard plastic or metal insulated chests can also be used for shipment. Styrofoam at least 1-inch thick, is preferred over thinner materials. When possible, select styrofoam coolers that have straight sides.

14. Pack coolers with samples and blue ice packs. Another alternative is plastic bottles filled with water and frozen. Ice cubes or block ice may be used if leakage can be prevented. Do not pack with dry ice.

15. Intersperse coolant (preferably blue ice) among specimens to provide maximum cooling for all contents in cooler.

16. Fill empty space within cooler with newspaper or bubble wrap to prevent material from being tossed around during transit.

17. Put chain of custody sheet (if required), Federal Express account number, and sample specimen history sheet into a ziplock plastic storage bag and tape to outside of top of cooler. If samples need to be saved for chemical analysis, send I-chem jars with specimens and note on specimens history forms, which tissues should be saved.

NOTE: BE SURE TO MAKE COPY OF CHAIN OF CUSTODY FORM FOR RECORDS.

18. Label outside top of cooler with the words "DIAGNOSTIC SPECIMENS" under the destination label in accordance with 42 CFR Part 72. Containers with wildlife specimens must bear the name and address of the shipper and consignee, and an accurate statement of contents must be conspicuously marked on the outside of the container in accordance with 50 CFR 14. This requirement can be met by writing "wildlife" under "DIAGNOSTIC SPECIMENS" and having the Standard Federal Express overnight mailer used for government packages. If using styrofoam coolers, which are placed in a box, the box must have the shipper and consignee name and address on box with "WILDLIFE" written below "DIAGNOSTIC SPECIMENS". The chain of custody form, sample specimen history form, and return mailer would be taped to cooler and not the box.

19. If Federal Express is not available, a carrier that can guarantee

24 hour delivery to NWHC must be used. Air freight is preferred over other types of carriers. Purolator, Emery, DHL, U.S. Postal Service Express Mail, and Federal Express have all proved satisfactory in meeting this requirement according to (Friend, 1987).

20. Seal cooler with strapping/packing tape with at least two bands running completely around the cooler.

21. Then seal cooler with at least one strip of chain of custody tape sealing two sides of the top of the cooler. Custody seals can be sued as an alternative.

22. If using a styrofoam cooler, insert cooler into box an tape box shut with packing tape and at least one strip of chain of custody tape.

23. Take cooler(s) to carrier. Retain copy of Federal Express or shipper receipt.

24. Verify delivery with NWHC the day following delivery.

25. Await preliminary results from NWHC.

#### IV. References

Friend, Milton, editor. 1987. Field guide to wildlife diseases. U.S. Fish and Wildlife Service, Resource Publication 167. 225 pp.

Prepared By: \_\_\_\_\_  
Daniel J. Audet  
Resource Contaminant Specialist

Approved By: \_\_\_\_\_  
Jay Watson  
Bunker Hill NRDA Project Manager



### EXAMPLES OF WILDLIFE POISONING CASES

1. Granular carbofuran was applied to chicken necks and a turtle shell to get rid of foxes on a chicken farm in Maryland.
2. A poisoned wolf was found in Minnesota with a sodium cyanide capsule in a ball of peanut butter in its stomach contents.
3. Strychnine-laced seeds were responsible for the deaths of eleven Canada geese in Reno, Nevada at a condominium complex.
4. Hotdogs laced with Temik (aldicarb) were being used to eradicate predators from a rabbit farm supporting the activities of a beagle club in Arkansas.
5. Rabbit legs laced with Temik on a rabbit farm/beagle club in Tennessee resulted in the deaths of a coyote, a kestrel, five red-tail hawks, two flickers, two mockingbirds, and two great-horned owls.
6. Thirteen bald eagles and three golden eagles died as a result of aldicarb poisoning in Utah. Sheep ranchers laced sheep carcasses with Temik.
7. Liquid carbofuran (Furadan) was injected in eggs and placed along the Belle Fourche River in South Dakota by a hopeful pheasant farmer. Approximately 40 fox, raccoons, and skunks and five bald eagles were poisoned. A couple months before this case went to trial, he laid out a deer carcass baited with carbofuran.
8. In Dewey County, South Dakota, a sheep/cattle rancher purchased approximately 16 gallons of liquid carbofuran in 1988. Every winter for three years, he placed 60 pounds of drop bait containing prairie dog meat and carbofuran. He was successful in poisoning approximately 40 eagles and several coyotes, fox, skunk, and badgers over the three years.
9. A bald eagle was poisoned after feeding on a dead cow treated with Famphur (Warbex) prior to its death in Pierre, South Dakota.
10. A rancher in Lyman County, South Dakota used arsenic on calf carcasses to poison coyotes.
11. Other poisoning incidents throughout the United States have involved the use of fenthion, parathion, carbaryl, methomyl, methiocarb, thallium sulfate and Compound 1080.

Common Chemicals (in order of frequency):

Carbofuran (Furadan)  
Aldicarb (Temik)  
Strychnine  
Famphur (Warbex)  
Phorate (Thimet)  
Sodium cyanide  
Compound 1080  
Thallium sulfate

**Questions that are Important When Initiating a Field Investigation of Wildlife Mortality<sup>1</sup>**

1. What species of animals are dying?
2. Approximately how many have died?
3. When did the dead and/or sick animals first appear?
4. Did the deaths occur over a short or long period of time?
5. What is the age and sex of each dead animal?
6. What are the symptoms of the sick or dying animals?
7. Are they dying fast or slowly?
8. Has anything similar to the present problem occurred before in this locality?
9. What were the climatic conditions preceding the problems?
10. What is the condition of the habitat of the species that is dying?
11. What is the general vegetative makeup of the problem area?
12. What are the animals eating?
13. What are the major water supplies?
14. Has anything unusual happened in the area recently (pesticide use, land clearing, drought, floods, large numbers of insects, changes in types of crops planted, etc.)?
15. Could anyone intentionally or unintentionally have poisoned the animals?
16. Have there been any livestock deaths?
17. What are the human and wildlife population densities?
18. What is your opinion, and that of the local persons, as to what may have caused the problem?

---

<sup>1</sup> Adapted from Davidson, W.R. and Nettles, V.F. 1988. Field Manual of Wildlife Diseases in the Southeastern United States.

**Recommendations for Collection, Preservation, and Shipment of Specimens<sup>1</sup>**

1. Regulating authorities for the shipment of hazardous materials are responsibility of the Department of Transportation (DOT) and the International Air Transport Association (IATA). These recommendations are provided in an attempt to meet the requirements of these regulations.
2. Early evaluation of the potential for toxic exposure to the investigator as well as the public should be recognized. If there is evidence of acute toxicosis to wildlife, steps to protect the investigator from both skin and respiratory contact are essential. Most organophosphates and carbamate pesticides are quickly absorbed through the skin and may cause symptoms and even death in a very short time. The handling of affected wildlife by rehabilitators or other members of the public not only increases the chances of liability, but destroys the chain of evidence and usually the chances for diagnosis.
3. Evidence in poisoning cases may include dead animal parts or whole carcasses, baits, containers, vomitus or feces from animals, crystals or granules mixed in soil or grain, vegetation, etc. Such evidence should only be handled with heavy rubber gloves, forceps or other devices. Thin disposable "examination" gloves do not provide the protection needed. If water is involved, remember that it is easily absorbed through the skin. Transportation of contaminated evidence inside a closed vehicle should be avoided, especially if the suspected material has any evidence of an odor.
4. Samples should be at least double wrapped in heavy gauge plastic bags. Beaks, talons, claws or broken bones left unpadded or exposed may tear or puncture plastic bags. Baits or grain may be collected in clean or new glass containers or aluminum foil. "Chemically clean" containers, available from commercial sources are preferred and will stand up in court if the question of extraneous contamination of evidence is raised. Consult with the local Environmental Contaminant Division biologist for more information. Also refer to Attachment IV.7.
5. Each piece of evidence should be separately wrapped and clearly labeled as hazardous on the outer wrapper to warn persons handling the material of its potential toxic hazard. Do not put labels, evidence tags or other information inside the bag.
6. Documentation appropriate for crime scene investigations and a chain of custody should accompany the evidence. All carcasses and wet material must be frozen as soon as possible. When freezing evidence, allow adequate space for air circulation around the sample and do not overcrowd a freezer. This delays the freezing of internal organs in a whole carcass and contributes to the decomposition and loss of pathological detail.
7. Specimens should be sent to the laboratory as soon as possible. Long term storage at normal home freezer temperatures will enhance the possibility of degradation or even total loss of some poisons. Do not freeze or store cases from toxicological investigations in the same freezer where food is kept.
8. After collection, take appropriate steps to clean or destroy all gloves or materials which may have been contaminated. Thoroughly wash

---

<sup>1</sup> Adapted from Stroud, Richard K. - U.S. Fish and Wildlife Forensics Laboratory, Ashland, OR. "Investigating Wildlife Poisoning Cases" 1993

your hands and other exposed skin surfaces prior to eating, drinking or smoking. It may be appropriate to place warning signs around the investigation site if all the contaminated material cannot be cleaned up or properly disposed of according to regulations (refer to Attachments VI. and VII.).

9. Shipment of the case evidence to the laboratory should always be preceded by a telephone call to the diagnostician or chemist to determine if the laboratory has the capability to process the evidence for the suspected poison. In some cases, the primary processing may be done by one laboratory who will then be responsible for contracting a second laboratory that can provide a secure chain of custody and has personnel experienced and trained in courtroom testimony should be entrusted with legal cases.
10. Shipment of poisonous substances is highly controlled by both the Department of Transportation regulations and commercial carriers. Shipment of even small quantities of known poisons require special packaging, documentation and shipping restrictions. Shipment of suspected poisoned carcasses is less restricted where the toxic substance is found only in a small quantities encased within the body.
11. Maintain a chain of custody throughout the analytical process is extremely important. The weakest point for attack by defense lawyers is the handling of evidence. Disputing the scientific findings and interpretation of data by qualified scientists usually requires the hiring of expert witnesses of equal scientific stature.
12. Frozen samples should be well secured and packed in dry ice in a sturdy cardboard box with styrofoam sheet insulation or preferably in a strong plastic, insulated cooler. Coolers can be returned upon completion of examination. Carcasses which arrive thawed and/or in broken containers may lose some of the poison through natural degradation of the chemical. Brain cholinesterase in cases involving organophosphate and carbamate poisoning are adversely affected by carcasses thawing in transit. The brain always thaws first.
13. Place dry ice in bags or blue ice around bagged specimens in the cooler. DO NOT PUT ICE INSIDE BAGS CONTAINING SPECIMENS! (**NOTE:** Dry ice is a regulated material.)
14. Seal the cooler securely with duct tape and evidence tape. Put hazard labels with suspected poison (if known) on the cooler.
15. Put sealed cooler into a box and seal tightly. It is presently not recommended to put hazard labels on the outside of the box.
16. When shipping pure chemicals, make certain containers are sealed securely. A good precautionary measure is to place the container in a second container (like a metal can) with packing material like vermiculite. When shipping liquids, efforts should be made to keep samples in an upright position. Safe send #M containers are available upon request at the lab.
17. Leaking packages may be a major health concern to postal package handlers and lab staff. Never ship a frozen package so that it arrives on a weekend or holiday without arranging for a special pickup by laboratory personnel.
18. Ship specimens by overnight Federal Express. Contact the lab before shipment to determine the appropriate arrival date. Other questions regarding the shipment should be referred to your local Federal Express and/or the lab. When discussing the specimens to be shipped, refer to them as environmental samples to be analyzed for poisons.



### WHERE TO SEND CONTAMINANT SAMPLES

Three different federal laboratories are routinely utilized for analysis of contaminants. The addresses, phone numbers, and a brief description of responsibilities are provided below.

1. National Fish and Wildlife Forensics Laboratory  
1490 East Main Street  
Ashland, Oregon 97520  
(503) 482-4191

The Ashland facility is the primary use lab for wildlife law enforcement. They conduct necropsy examinations (cause of death) and are capable of identifying most carbamate pesticides such as carbofuran, aldicarb, carbaryl, etc. They also do whole brain cholinesterase.

Ashland Lab maintains a good working relationship with other labs and if analysis is beyond their capabilities, they will forward samples to the appropriate experts. They will take only evidence items from cases involving legal investigations. Submission of samples should be coordinated through the Division of Law Enforcement. The lab will also provide experts for on-site assessments at a crime scene.

2. Wildlife Health Research Center  
6006 Schroeder Road  
Madison, Wisconsin 53711  
(608) 264-5411

The Madison Lab is capable of making cause of death assessments in multiple disciplines. They are consulted extensively with regard to wildlife disease situations and routinely conduct necropsy examinations on wildlife.

This Lab also provides support for environmental contaminant issues. They can identify many contaminants but they do not do pesticide analysis. They will do cholinesterase screening and will then refer samples to the appropriate experts based upon the initial findings.

3. Patuxent Wildlife Research Center  
Route 197  
Laurel, Maryland 20708  
(301) 497-5583

In addition to research, the Center performs detailed chemical analysis of soil, sediments, water, and animal tissue. They work closely with our Environmental Contaminants section and are consulted in cases relating to negative environmental effects, such as we have come to expect with Superfund sites and agricultural contaminants.

The Patuxent Lab is willing to respond to wildlife mortality events with technical assistance, including on-site evaluations. They will also provide training workshops.

## THE DIVISION OF LAW ENFORCEMENT'S ROLE IN ENVIRONMENTAL CONTAMINANT ACTIVITIES

### What Federal Wildlife Laws Apply?

Congress has enacted numerous Federal statutes designed to protect and preserve our Nation's valuable fish and wildlife resources. Three such statutes have provisions which prohibit or restrict the "taking" (killing) of certain wildlife, including the "taking" by contaminants.

The first, and probably the most significant, is the Migratory Bird Treaty Act (16 USC 703-712). The Migratory Bird Treaty Act (MBTA), first enacted in 1918, affords protection to over 750 species of migratory birds. A complete list of all protected migratory birds is found at 50 CFR 10. It is a violation of the MBTA to "take a migratory bird except as permitted by regulation".

The term "take" is not defined by MBTA; therefore, the definition for this term found at 50 CFR 10 would apply. By that definition, "take" means "...to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect...".

The MBTA is a particularly significant statute when dealing with wildlife losses due to contaminants because of its strict liability standards. That is, it is not necessary to show that a person or company knowingly or intentionally killed migratory birds in order to obtain a criminal conviction under the MBTA.

In two significant decisions, Federal courts have ruled on this matter. The U.S. Court of Appeals for the Second Circuit ruled in U.S. vs. FMC Corporation that -- FMC engaged in an activity involving the manufacture of a highly toxic chemical; and FMC failed to prevent this chemical from escaping into the pond and killing birds. This was sufficient to impose strict liability on FMC.

In a second case, U.S. vs. Corbin Farm Service et al., the United States District Court for the Eastern District of California ruled that the MBTA includes poisoning as a prohibited act and that the MBTA can constitutionally be applied to impose criminal penalties on those who did not intend to "take" migratory birds. The court also ruled, as part of this same decision, that where there has been a violation of the MBTA resulting in the death of more than one migratory bird, each act resulting in the death of one or more birds, rather than each dead bird, constitutes a "unit of prosecution". This latter ruling was later upheld by the Ninth Circuit Court of Appeals.

In a related case, the United States Court for the Eastern District of Virginia upheld the right of the State of Virginia and the United States to file claims for damage to migratory waterfowl against Stuart Transportation Company (Civil Action No. 76-697-N). The case involved the loss of approximately 30,000 migratory birds as a result of an oil spill.

The provisions of the MBTA were invoked by Secretary of the Interior Hodel in the Kesterson National Wildlife Refuge issue. In this case, irrigation return flows containing high concentrations of selenium were adversely impacting migratory birds on the refuge and elsewhere. Litigation resulted in the

closure of a Bureau of Reclamation irrigation project, as well as the refuge.

A second statute, the Endangered Species Act (16 USC 1531-1543) prohibits the "taking" of any endangered or threatened species. Fish, wildlife and plant species afforded protection under this Act are listed in CFR 50 17. The Act defines the term "take" as meaning "...to harass, harm, pursue, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct...". Unlike the MBTA, in order to sustain a criminal prosecution, it is necessary to demonstrate that a person or entity knowingly violated the Act. Similarly, a civil penalty of more than \$500 can be assessed only if it can be shown that the person who committed the violation knew the action was illegal and proceeded anyway.

The higher culpability standards in the Endangered Species Act and the reduced likelihood of documenting the taking of endangered or threatened species via contaminants can significantly limit potential criminal prosecutions under this Act.

The Bald and Golden Eagle Protection Act prohibits the taking of Bald and Golden eagles. The term "take", as defined by the Act, includes "...pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb...". The culpability standards for this Act are somewhat less than those found in the Endangered Species Act. It is a criminal violation for someone to knowingly, or with wanton disregard for the consequences of his act, to take a bald eagle or golden eagle. Further, there is a strict liability standard for assessment of civil penalties under the Bald and Golden Eagle Protection Act.

#### When should Law Enforcement be notified?

The local Special Agent should be notified when any potential violation is detected. If a Special Agent cannot be contacted, the information may be given to the nearest Special Agent-in-Charge. The address and phone number for each Special Agent-in-Charge is cited in 50- CFR 10 and in regional Service directories.

Any significant incidents of dead or dying migratory birds and other wildlife should be reported to the Division of Law Enforcement. Also report exposed contaminant sources that appear to pose an immediate threat to wildlife (e.g. uncovered oil sludge pits).

Special agents can secure clearance for prosecution-related rapid-turnarounds of wildlife necropsies at the National Wildlife Health Center, in Madison, Wisconsin. FWS law enforcement officials also may require assistance from Environmental Contaminant specialists in preparing a contaminant sample catalog in order to transfer various tissues, organs, stomach contents, etc., to the Patuxent Wildlife Research Center for chemical analysis (e.g., to confirm whether a pesticide is present in the stomach contents of a dead bald eagle).

#### What investigative procedures should be followed when dealing with suspected violations?

The most important consideration in documenting a suspected violation is the collection and preservation of evidence in such a way that it will be admissible in court at some later date. All potential evidence should be marked or labeled at the time of collection. The label should contain



sufficient information to show who collected the material, where it was collected, when it was collected, how the material was collected; and what was collected. The label also should either be signed or initiated by the collector. Photographs should be taken and drawings prepared which clearly depict the sampled area and the relationship among the collected samples. A log should be prepared at the time photographs are taken to document the information shown and the name of the photographer.

A chain of custody must be maintained on all potential evidence in order to ensure that it will be admissible in court. It is necessary to prove that evidence collected at a particular site is the same evidence on which testimony is based. Note: Never let potential evidence out of your sight, unless it is locked away where only you have access to it. For example: if you have collected dead birds and are returning to your duty station, if you stop to eat, make sure the evidence is in a locked vehicle and that you sit in a place in the restaurant where you can watch to make sure (so that you can attest in court) that nobody tampered with the vehicle while you were eating. Be sure to store evidence in a locked freezer or have the freezer in a locked room secure from unauthorized entry. These actions can help prevent the FWS from losing a criminal or civil prosecution on the grounds that (it was not beyond a reasonable doubt that the evidence could have been tampered with).

When potential evidence is passed from one individual to another for storage or testing, a Chain of Custody form must be signed by each individual. Each such transfer must be clearly documented on the form. Every individual who handled the evidence may be required to testify in court before the item can be admitted as evidence. Chain of Custody forms, evidence tags and other similar material can be obtained by contacting the Law Enforcement Division. An example of a Chain of Custody form has been included in this manual.

#### What type of technical assistance will be needed from Environmental Contaminant Specialists in potential criminal prosecution matters?

A successful prosecution will require that a direct cause-effect relationship between a particular contaminant site and the loss of fish and wildlife resources be established. Timely collection of evidence at the site is the first important step where an Environmental Contaminant Specialist should work closely with a FWS Special Agent. Generally the evidence needed will include water and soil samples, food samples, dead or dying wildlife and any additional samples or data that may have a bearing on the situation.

Technical expertise concerning particular contaminants also will be needed to prove a violation. The type of technical information required will include the following:

- What is considered a lethal level of a particular contaminant?
- What was the level of the contaminant found at the site?
- What was the level of the contaminant found in the dead or sick wildlife?
- What is the normal or background level of the contaminant in the environment?

## CHAIN OF CUSTODY PROCEDURES

With increasing frequency, many FWS biologists are finding themselves involved in contaminant studies which are either potential Law Enforcement (LE) cases or may eventually lead to some type of litigation. Due to the sensitivity of these studies, additional precautions are often required to ensure that residue data generated from a sample collection are admissible evidence in a court of law. Special handling and shipping of sample collections under a chain of custody may be necessary to ensure the integrity of these data. Many studies, initiated by LE special agents, particularly bird die-offs and possible poisoning cases, will require proper handling of the samples from the time they are collected in the field until the time they reach the final laboratory slated to analyze the samples. The Chain of Custody Record (Form 3-2063, see section 4.45) essentially documents the string of individuals who have physically had the samples in their possession and have implemented proper security measures to eliminate the potential of tampering. This form is initiated by the individual who collects the samples and must remain with the samples as they are transferred from person to person and lab to lab. The completed form is retained with the permanent catalog files at PACF and is available upon request.

To properly use the Chain of Custody form, all the sections must be filled out (typed) with specific information pertaining to the sample collection. If samples were collected from different sites or on several dates, multiple forms will be necessary. Special attention should be applied to the sample inventory/description section as only the samples that are accurately described including exact sample I.D. are considered to be valid for litigation purposes. When using a chain of custody procedure, all samples included in the sample catalog should be clearly listed on the sample inventory section of the form, including the evidence tag number. If more than one container is required to ship the samples, a separate form for each will be required, listing the samples actually held in each cooler. An indication of the total number of containers (i.e., 1 of 3) should be noted on each form. After filling out the appropriate information, the form should be placed in a clear plastic shipping window and securely attached to the outside of the container with the words "chain of custody record" clearly visible. The container should be of sturdy construction and well sealed first with filament tape, and then with an unbroken strip of evidence tape. This tape "seal" must remain intact until the container reaches its final destination, and as an added precaution, the sender may wish to sign and date the evidence seal over the area that would need to be broken, if opened. When releasing the sample containers to another individual, you should sign the first available space marked release signature and witness the recipient's signature, at which point the security responsibility transfers to the new recipient. Prior to accepting the package, the recipient should inspect the container to ensure the integrity of the custody seal.

Attached are two sample chain of custody examples, resulting from one hypothetical sample collection. The first (see section 4.46) pertains to the initial transfer of bird carcasses from the investigating special agent to the contaminant specialist, then to the National Wildlife Health Research Lab (NWHRL) for diagnostic necropsy and pathology work up. Note that each carcass has been assigned a unique I.D. (seizure tag number) which should be attached to both the outside of the bag or container as well as the carcass itself. All I.D. tags should be written with waterproof ink. Each sample is listed as a separate item under the description section and should be listed sequentially under item number column. Also note when using a commercial courier, the airbill number should be clearly documented under the "delivered by other" notation. A copy of the chain of custody form and the airbill should be retained by the submitter.

On the second example (see section 4.47), the same hypothetical samples are shipped from NWHR to two different laboratories for chemical analysis. The sample description now includes the case number I.D. assigned by NWHR, as well as the original evidence tag I.D. This is required to cross-reference the two numbering schemes and allow proper identification of the samples. Note that three red-winged blackbird G.I. tracts have been pooled into one sample, while two distinct tissues (samples) have been removed from one eagle carcass. This means there are now a total of five samples from the original six carcasses that were collected. Since the catalog is to be split between two labs, a photocopy of the chain of custody record showing the complete sample catalog should be forwarded to each lab with the samples. A solid line should be placed directly under the last entry in the description section with a notation indicating a total number of samples. Any changes to the typed information should be initialed by the individual making the changes.

---

## OVERVIEW OF REGULATIONS ENVIRONMENTAL PROTECTION

### Environmental Protection Agency

Three major laws guide the U.S. Environmental Protection Agency:

1. **RCRA (1976) - Resource Conservation and Recovery Act**

This Act spells out how any facility that generates, treats, stores, or disposes of hazardous waste must handle it, from creation to final destination.

2. **CERCLA (1980) - Comprehensive Environmental Response Compensation and Liability Act (The Superfund)**

This Act creates a mechanism of response to mitigate chronic environmental damage associated with abandoned or uncontrolled hazardous waste sites and provides for the emergency removal of hazardous waste released through accidental spills. CERCLA also provides for federal funding as needed for hazardous waste clean-up activities.

3. **SARA (1986) - Superfund Amendments and Reauthorization Act**

Concern about the hazardous chemical releases, such as Bhopal, India and Nitro, West Virginia, as well as the discovery and identification of more and more toxic and hazardous waste sites, provided the momentum for Congress to expand Superfund in 1986 to provide for comprehensive and effective management of hazardous waste sites and chemical emergencies.

SARA extends and amends CERCLA, providing \$9 billion (from 1986-1990) to fund clean-up operations. SARA also mandates minimum levels of health and safety training for workers involved in hazardous waste site operations and emergency response work. It was SARA which required OSHA to promulgate CFR 1910.120 entitled, "Health and Safety Protection for Hazardous Waste Operations and Emergency Response Work" (the regulation requiring this training). The Superfund Amendments and Reauthorization Act (SARA) is made up of three sections, or 'Titles'.

- \* requires reporting of toxic releases

Facilities must notify (by radio, phone or in person) the LEPC and the SERC if there is an accidental release of any of the listed hazardous substances in excess of the "reportable quantity". In addition, citizens must have direct access to this chemical information, as well as to the LEPC's emergency response plan.

This Act requires mandatory reporting of chemical information by facilities who have "Threshold Planning Quantities" of EPA's "Extremely Hazardous Chemicals".

- \* Requires the development of emergency response plans

States, along with designated districts within the States, must develop local emergency response plans required by the OSHA 1910.120 standard. Each employer must ensure that its own emergency response plan is compatible with the local plan.

On March 6, 1990, the Final Rule replaced the existing Interim Final Rule, which had been in effect since December 19, 1986. The most significant changes were made in the duration of training required for emergency response personnel and hazardous waste workers.

## **Right-To-Know Law**

Oregon State passed the "Right-To-Know" law in 1980, which gives employees the right to information, including Material Safety Data Sheets, about the hazardous materials which they handle on their jobs. This law applies to all State and local public employees. Private-sector employees are covered by the OSHA Hazard Communication Standard.